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XVII. *On the change in the plumage of some Hen-Pheasants.*

By WILLIAM YARRELL, *Esq. F. L. S.* Communicated by
WILLIAM MORGAN, *Esq. F. R. S.*, March 19, 1827.

Read May 10, 1827.

THE latter part of the last shooting season has been unusually productive of those hen-pheasants which assume, more or less, the appearance of the male, and considerable discussion has, in consequence, arisen as to the cause of this change in the plumage.

Chance, rather than design, having supplied me with many opportunities of observation both on pheasants and the common domestic fowl, I am induced to notice the internal peculiarities that have been observed invariably to accompany this change of feather, and such other circumstances as appear connected with this subject, some of which I think will be found new and interesting.

A Paper on this subject, by Mr. JOHN HUNTER, published in the 70th Volume of the Philosophical Transactions, and afterwards reprinted in his "Animal Economy," details the appearance of several female birds having the feathers of the male, in which account he is led to observe, "that this change of character takes place at an *advanced age* of the animal's life, and does not grow up with it from the beginning."

In the Third Volume of the Memoirs of the Wernerian Society, Mr. JOHN BUTTER devotes a Paper to a consideration of the change which takes place in certain hen-birds at an

advanced period of their lives, and concludes, "that all hen-pheasants as well as common-fowls would assume the plumage of the cock to a certain degree, if they were kept to a certain age."

Some further observations on this subject by Monsieur ISIDORE G. ST. HILAIRE, will be found in the "*Annales des Sciences Naturelles*," and in the Eleventh Number of Dr. BREWSTER's Edinburgh Journal.

The remarks I shall have occasion to introduce, will be found somewhat at variance with the opinions of the writers above referred to, who appear to consider that age is absolutely necessary to produce this change: I shall be able to show, that certain constitutional circumstances producing this change, may, and do, occur at any period during the life of the fowl, and that they can be produced by artificial means.

Besides various opportunities during former seasons, I had the advantage, in the months of December and January last, of examining seven hen-pheasants, in plumage more or less resembling the male, in all of which the sexual organs were diseased, but with some variation as to extent, and the progress of change observable in the plumage bore a corresponding analogy. The ovarium was contracted in size, of a purple colour, and hard to the touch; the spherical shape of the ova destroyed in some; the oviduct also diseased throughout its whole length, and the canal obliterated at the upper part immediately preceding the funnel-shaped enlargement at the bottom of the ovarium.

The parts were all preserved, and deposited in the Museum of the Zoological Society.

Desirous of possessing a specimen of the organs from a

healthy female to contrast with the preparations of such as were in a diseased state, a hen-pheasant in the natural plumage was opened for examination ; but in this instance disease prevailed throughout the whole of the ovarium, but had not affected the oviduct ; proving, that this disease exists in the sexual organs previous to the change in the feather ; and this corresponds with the recorded observations of others, where hen-pheasants in confinement, and females of the common-fowl in the poultry yard, had been known to have ceased producing eggs two years before any change was observed in their plumage.

That the obliteration of the true character of the female organs by disease, and the consequent alteration of feather, takes place at various periods, are inferred from the following circumstances. Among the large broods of young pheasants, frequently from fifty to one hundred birds in number, which some gamekeepers are exceedingly successful in rearing by hand, produced from eggs laid by birds in confinement, nests deserted from various causes, or eggs exposed by mowing ; it is by no means unusual in the months of August and September, when the young birds put forth the first plumage indicative of the sex, that one or two females are observed to produce the brighter coloured feathers of the male. These birds are then about four months old only. In two instances, among the hen-pheasants before mentioned, as shot in a wild state, some of the first plumage, usually called nest feathers, had not been shed, evidence sufficient to prove that they also were both birds of the year.

A partridge sent me by a friend in December last, on account of its having a white bar across the breast, and the

first three primaries of each wing also white, was opened in the presence of two persons, and found to be under the influence of the same sort of disease apparent in the organs of a hen-pheasant examined at the same time by way of comparison. This partridge was one of a covey bred during the summer of 1826, several of the young birds of which exhibited some white feathers. This circumstance was often noticed by the keeper, but only one bird was procured. The clay-coloured legs, as well as the plumage in this specimen, were additional evidence that this partridge also was a bird of the year.

A few of the feathers on the breast bore the chesnut colour peculiar to the male of this species.

It may be objected to this example, that the colour of the altered feather was not entirely that of the male; but I have quoted this instance in order to show that it was a young bird; that the female organs were destroyed by disease; and that a change in the colour of the plumage had taken place.

The assumption of plumage decidedly resembling that of the male, must not however be confounded with accidental varieties. All variations of feathers are not caused by an alteration of the sexual organs. I have examined several birds of various species in which those parts were perfectly healthy; but such birds are generally smaller than the natural size of the species to which they belong; and the variety of plumage in them probably originates in an imperfect secretion arising from weakness.

That this disease arises at later periods during the life of the bird, but still long previous to a natural cessation of the powers of reproduction as a female, seems almost certain

from the circumstance that in some of the preparations of the parts of the hen-pheasants examined, the distinct globular forms of numerous ova are still apparent, but altered in colour; from which it would appear probable, that had not this disease occurred, these embryos would in due season have been matured and deposited.

Having shown that a particular change of feather follows the destruction of the sexual organs by disease, I shall proceed to describe the effects produced upon both sexes of the common fowl, when obliteration of the same parts is effected by artificial means, that is to say, by an operation.

The breeder of poultry, who practises the art of making capons, is apprized by the attempts of the young male bird to crow, that a sufficient enlargement of the testes has taken place to enable him to perform the operation of extraction with ease and certainty; but this act completed, the bird never crows after. The comb and gills do not attain a size equal to those of other males not subjected to this operation; the spurs appear, but remain short and blunt; and the long narrow feathers of the neck and lower part of the back, so characteristic in the true male, put on an appearance in this bird, intermediate between the hackled appearance in the cock, and the ordinary web of the hen.

The operation performed on the female of the common fowl is much more simple than might be expected. It consists in making a small incision through the thin skin of the flank on the left side; the oviduct, which lies immediately within, is thus easily brought into view; and it is then only necessary to cut away a small portion of it, that the continuity of the canal may be destroyed. The ova do not afterwards

enlarge, and the connexion between the sexual organs and those of the voice are not less remarkable in the females than that before observed to exist in the male. She makes an imperfect attempt to imitate the crow of the cock, there is an increase in the size of the comb, and a spur or spurs shoot out, but remain short and blunt. The plumage undergoes an alteration, which is called by the breeders getting foul feathered, becoming hackled in form, and altered in colour. But a more singular point is, the peculiar shape of the lower part of the back in these birds, from the want of that enlargement of the bones, observed in all true females, by which they obtain a breadth of pelvis sufficient to allow a safe passage to the perfect egg, an object the more particularly necessary, when it is recollected that a slight fracture of its brittle shell is sufficient to prevent the developement of the chick.

As the object in performing this operation upon fowls is to gain an increase in size, still preserving the delicate texture of the flesh, these birds when ten or twelve months old are sent off to the London markets, and farther observation prevented; but so great is the similarity at this age between some examples of this description, that it is frequently difficult to determine the sex by such external characters as remain. Thus, males and females, becoming as it were neuter in gender by the deprivation of the sexual organs, put on a corresponding appearance, and both assume characters decidedly intermediate between the true sexes.

The influence exercised by the sexual organs upon the colour of the feathers, as well as the voice, is not confined to this effect alone. The summer plumage of some birds, and

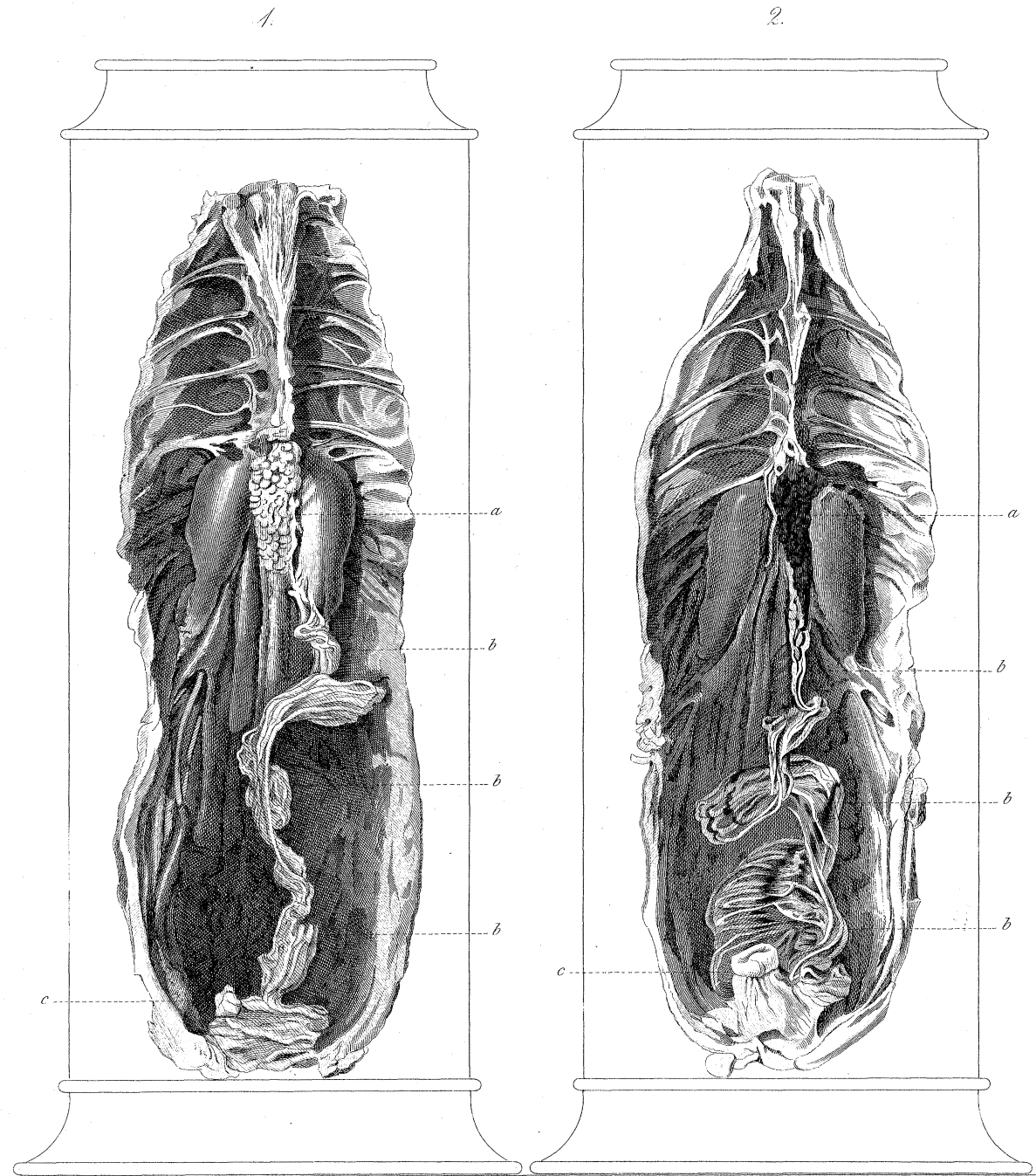
the brighter tints of others, called by French authors *plumage des noces*, do not make their appearance till the sexual organs begin to dilate under the genial influence of spring.

The various songsters pour forth their constant and most melodious strains only during the season of producing and rearing their young ; and some birds, as the cuckoo, quail, &c. appear capable of exercising their voice but for a limited time, confined to the same period of the year. With the decline of summer the sexual organs again contract, the voice subsides, and the plumage losing its brilliancy, assumes by degrees more valuable shades of grey and white for defence during the rigour of winter.

Returning again to the subject of hen-pheasants that are said to exhibit the feathers of the cock, it may be stated generally, that at best it is but an approximation to the plumage of the male.

It is probable that they do not live many years after the commencement of the change, since so few are found to arrive at any great degree of splendour. Of the many I have had opportunities of examining, none possessed either the full-sized broad scarlet patch round the eye, the fine blue zone at the end of the red feathers of the breast, or much of the bright straw-coloured mark on the scapulars and wing-coverts, one specimen alone excepted ; nor have I seen a female pheasant with spurs ; and a bird belonging to Mr. LEADBEATER, which is by many degrees the finest I have ever seen, is also without any.

From these detailed observations it will probably be granted that age is not necessary, but that this disease, with its consequences, may arise at any period during life ; and that the



changes in the external character depending on the destruction of the sexual organs, may be effected by artificial means.

From several examples in different classes and orders, I am induced to believe it will be found a law of nature, that in all animals bearing external characters indicative of the sex, besides the sexual organs, those characters will undergo a change, and exhibit an appearance intermediate between the perfect male and female, whenever the animal happens to be deprived of the influence of the true sexual organs, whether from original malformation, subsequent disease, or artificial obliteration.

February, 1827.

EXPLANATION OF PLATE XII.

No. 1. Part of the body of a female pheasant, the sexual organs in the natural state: all the other viscera removed.

a, the ovarium, with its ova ; natural state.

b, b, b, the oviduct.

c, part of the intestine, tied.

No. 2. Part of the body of a female pheasant.

a, the ovarium diseased, discoloured, spherical character of the ova destroyed.

b, b, b, the oviduct, exhibiting the same disease, and its consequent discoloration throughout the whole length.

c, part of the intestine, tied.